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U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES

1200.459

DESIGNATED/ELECTED OFFICE (DO/EO/US)

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

CONCERNING A FILING UNDER 35 U.S.C. 371

09/787952

INTERNATIONAL APPLICATION NO.

PCT/FR00/02245

INTERNATIONAL FILING DATE

4 August 2000

PRIORITY DATE CLAIMED

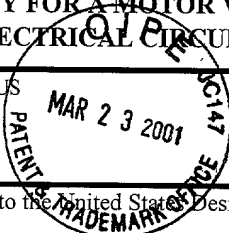
9 August 1999

TITLE OF INVENTION

SYSTEM, ESPECIALLY FOR A MOTOR VEHICLE, ABLE TO START AN INTERNAL-COMBUSTION ENGINE AND CHARGE AN ELECTRICAL CIRCUIT

APPLICANT(S) FOR DO/EO/US

RICHARD, Daniel



Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ A copy of the International Search Report (PCT/ISA/210).
8. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ Certificate of Mailing by Express Mail
20. ☐ Other items or information:

Form PCT/RO125; 3 Cited Ref

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| U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 09/787952) | INTERNATIONAL APPLICATION NO. PCT/FR00/02245 | ATTORNEY'S DOCKET NUMBER 1200.459 |
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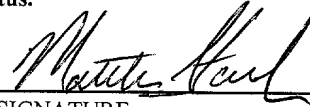
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| 21. The following fees are submitted: | | | | CALCULATIONS PTO USE ONLY | |
| BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) : | | | | | |
| <input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO | | | | \$970.00 | |
| <input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO | | | | \$840.00 | |
| <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO | | | | \$690.00 | |
| <input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) | | | | \$670.00 | |
| <input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) | | | | \$96.00 | |
| ENTER APPROPRIATE BASIC FEE AMOUNT = | | | | \$840.00 | |
| Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (e)). | | | | \$0.00 | |
| CLAIMS | NUMBER FILED | NUMBER EXTRA | RATE | | |
| Total claims | 16 - 20 = | 0 | x \$18.00 | \$0.00 | |
| Independent claims | 2 - 3 = | 0 | x \$78.00 | \$0.00 | |
| Multiple Dependent Claims (check if applicable). | | | <input type="checkbox"/> | \$0.00 | |
| TOTAL OF ABOVE CALCULATIONS = | | | | \$840.00 | |
| Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable). | | | | <input type="checkbox"/> | \$0.00 |
| SUBTOTAL = | | | | \$840.00 | |
| Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (f)). | | | | \$0.00 | |
| TOTAL NATIONAL FEE = | | | | \$840.00 | |
| Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). | | | | <input checked="" type="checkbox"/> | \$40.00 |
| TOTAL FEES ENCLOSED = | | | | \$880.00 | |
| | | | | Amount to be refunded | \$ |
| | | | | charged | \$ |

- ☒ A check in the amount of **\$880.00** to cover the above fees is enclosed.
- ☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.
- ☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **50-0548** A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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 SIGNATURE
Matthew W. Stavish
 NAME
36,286
 REGISTRATION NUMBER
March 23, 2001
 DATE

09/787952

JC03/Rec'd PCT/PTO 23 MAR 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: RICHARD, D.

Appl. No: unknown

Group Art Unit: unknown

Filed: March 23, 2001

Examiner: unknown

Title: SYSTEM, ESPECIALLY FOR A MOTOR VEHICLE, ABLE TO START AN
INTERNAL-COMBUSTION ENGINE AND CHARGE AN ELECTRICAL CIRCUIT

PRELIMINARY AMENDMENT

Hon. Commissioner of Patents
and Trademark
Washington, DC 20231

March 23, 2001

Sir: Please enter the following amendments prior to examination on the merits.

IN THE CLAIMS

Please amend claims 3,4,8, and 9 as follows.

3. System according to Claim 1, characterised in that the detection means include means for detecting a failure to start at the end of a given time during which the main electrical machine is operating in motor mode.

4. System according to Claim 1, characterised in that the management means include means for actuating the supplementary starter, when a condition for activating the supplementary starter is detected, in such a way that its pinion meshes on a complementary ring in order to drive the internal-combustion engine, in order to drive the main electrical machine in motor mode, when the pinion of the starter has been meshed and in order to cut off the starter and drive the main electrical machine in generator mode when it is detected that the internal-combustion engine has started.

8. Method according to Claim 6, characterised in that, in order to detect a triggering condition, a failure to start is detected at the end of a given time during which the main electrical machine is operating in motor mode.

9. Method according to Claim 6, characterised in that, when a condition for activating the supplementary starter is detected, the supplementary starter is actuated in such a way that its pinion meshes on a complementary ring in order to drive the internal-combustion engine, the main electrical

machine is put into motor mode, when the pinion of the starter has been meshed, and the starter is cut off and the main electrical machine is placed into generator mode when it is detected that the internal-combustion engine has started.

Please add new claims 11-16 as follows.

11. System according to Claim 2, characterised in that the detection means include means for detecting a failure to start at the end of a given time during which the main electrical machine is operating in motor mode.

12. System according to Claim 2, characterised in that the management means include means for actuating the supplementary starter, when a condition for activating the supplementary starter is detected, in such a way that its pinion meshes on a complementary ring in order to drive the internal-combustion engine, in order to drive the main electrical machine in motor mode, when the pinion of the starter has been meshed and in order to cut off the starter and drive the main electrical machine in generator mode when it is detected that the internal-combustion engine has started.

13. System according to Claim 3, characterised in that the management means include means for actuating the supplementary starter, when a condition for activating the supplementary starter is detected, in such a way that its pinion meshes on a complementary ring in order to drive the internal-combustion engine, in order to drive the main electrical machine in motor mode, when the pinion of the starter has been meshed and in order to cut off the starter and drive the main electrical machine in generator mode when it is detected that the internal-combustion engine has started.

14. Method according to Claim 7, characterised in that, in order to detect a triggering condition, a failure to start is detected at the end of a given time during which the main electrical machine is operating in motor mode.

15. Method according to Claim 7, characterised in that, when a condition for activating the supplementary starter is detected, the supplementary starter is actuated in such a way that its pinion meshes on a complementary ring in order to drive the internal-combustion engine, the main electrical

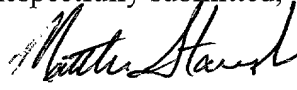
machine is put into motor mode, when the pinion of the starter has been meshed, and the starter is cut off and the main electrical machine is placed into generator mode when it is detected that the internal-combustion engine has started.

16. Method according to Claim 8, characterised in that, when a condition for activating the supplementary starter is detected, the supplementary starter is actuated in such a way that its pinion meshes on a complementary ring in order to drive the internal-combustion engine, the main electrical machine is put into motor mode, when the pinion of the starter has been meshed, and the starter is cut off and the main electrical machine is placed into generator mode when it is detected that the internal-combustion engine has started.

REMARKS

This preliminary amendment is intended to place the instant application in better condition for examination on the merits. Should the examiner believe further discussion would advance prosecution, they are invited to contact the undersigned.

Respectfully submitted,



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APPENDIX

3. System according to [one of Claims 1 and 2] Claim 1, characterised in that the detection means include means for detecting a failure to start at the end of a given time during which the main electrical machine is operating in motor mode.

4. System according to [one of the preceding claims] Claim 1, characterised in that the management means include means for actuating the supplementary starter, when a condition for activating the supplementary starter is detected, in such a way that its pinion meshes on a complementary ring in order to drive the internal-combustion engine, in order to drive the main electrical machine in motor mode, when the pinion of the starter has been meshed and in order to cut off the starter and drive the main electrical machine in generator mode when it is detected that the internal-combustion engine has started.

8. Method according to [one of Claims 6 and 7] Claim 6, characterised in that, in order to detect a triggering condition, a failure to start is detected at the end of a given time during which the main electrical machine is operating in motor mode.

9. Method according to [one of Claims 6 to 8] Claim 6, characterised in that, when a condition for activating the supplementary starter is detected, the supplementary starter is actuated in such a way that its pinion meshes on a complementary ring in order to drive the internal-combustion engine, the main electrical machine is put into motor mode, when the pinion of the starter has been meshed, and the starter is cut off and the main electrical machine is placed into generator mode when it is detected that the internal-combustion engine has started.

2/parts

JC03/Rec'd PGI/PTO 09/787952
23 MAR 2001

**SYSTEM, ESPECIALLY FOR A MOTOR VEHICLE, ABLE TO START
AN INTERNAL-COMBUSTION ENGINE AND CHARGE AN ELECTRICAL
CIRCUIT**

5 The present invention relates to the systems,
especially for motor vehicles, which, on the one hand,
start up an internal-combustion engine and, on the
other hand, charge an electrical circuit.

 It also relates to the control of such a system.

10 On motor vehicles, the internal-combustion en-
gine is usually started by a starter, while the charg-
ing of the battery and the power supply to the consumer
units is undertaken by an alternator.

 It has already been proposed to carry out these
15 two functions by means of an alternator used both as
generator and as electric motor. Such an electrical ma-
chine which carries out the two functions at the same
time is currently designated by the name of alterna-
tor/starter.

20 For a presentation of such a machine, reference
may advantageously be made to the patent FR 2 745 444.

 This machine is generally arranged in place of
the alternator. In motor mode, it drives the pulley of
the crankshaft by means of the belt which is also used
25 in generator mode. It is then spoken of as an alterna-
tor/starter of separate type, as opposed to alterna-
tor/starter machines which would drive the internal-
combustion engine directly by means of a pinion meshing
with a ring gear.

30 The alternator/starters of separate type exhibit
certain drawbacks, when operating in motor mode.

 Especially under certain extreme conditions,
particularly at low temperature, the internal-
combustion engine offers a substantial resisting torque
35 which can prevent satisfactory driving via the belt.

Likewise, separate alternator/starters do not allow for rapid starting in all cases. The starting time can be relatively lengthy, especially if the internal-combustion engine is experiencing injection problems, or else because of the fact that the belt is slipping, etc.

However, it is desirable for the starting-up of a vehicle to be able to be carried out in relatively short times, in particular when the on-board computer of the vehicle implements a mode of operation, for the internal-combustion engine, with automatic cut-off and restarting of the internal-combustion engine when the vehicle is stopped (operation of "stop & go" type, according to the terminology usually used by the person skilled in the art).

The invention, for its part, proposes a starting and charging system and a drive which makes it possible to remedy these drawbacks.

More particularly, the invention relates to a system, especially for a motor vehicle, able, on the one hand, to start up an internal-combustion engine and, on the other hand, to charge an electrical circuit, including a main electrical machine able to operate, on the one hand, as a generator and, on the other hand, as an electric motor, the said electrical machine driving the internal-combustion engine by means of a belt when it is operating in motor mode, the system further including management means which drive the main electrical machine.

The said system is such that it includes a supplementary starter, as well as means for detecting at least one condition for triggering the activation of the said supplementary starter, and the management means drive the main electrical machine and the starter, according to a particular sequence, when the said condition is detected by the said detection means.

Thus the system includes supplementary starting means (the starter) which, when a condition requiring them to be activated is detected, supplements the main electrical machine, according to a synchronised operation, with that of the said machine.

Moreover, such a system is advantageously supplemented by the various characteristics below, taken alone or in all their technically possible combinations:

- the said detection means include at least one temperature sensor, as well as means for comparing a temperature measured by the said sensor with a particular low threshold.

- the detection means include means for detecting a failure to start at the end of a given time during which the main electrical machine is operating in motor mode.

- the management means include means for actuating the supplementary starter, when a condition for activating the supplementary starter is detected, in such a way that its pinion meshes on a complementary ring in order to drive the internal-combustion engine, in order to drive the main electrical machine in motor mode, when the pinion of the starter has been meshed and in order to cut off the starter and drive the main electrical machine in generator mode when it is detected that the internal-combustion engine has started.

- the management means include means for cutting off the operation of the main electrical machine in motor mode, when a condition for activation of the supplementary starter is detected.

The invention also relates to a method for control of a system, especially for a motor vehicle, able, on the one hand, to start up an internal-combustion engine and, on the other hand, to charge an electrical circuit, including a main electrical machine able to

operate, on the one hand, as a generator and, on the other hand, as an electric motor, the said electrical machine driving the internal-combustion engine by means of a belt when it is operating in motor mode, according to which, with the said system including a supplementary starter, at least one condition for triggering the activation of the said supplementary starter is detected, and the main electrical machine and the starter are driven according to a particular sequence when the said condition is detected.

Such a method is advantageously supplemented by the various technical characteristics below, taken alone or according to all their technically possible combinations:

- in order to detect a triggering condition, at least one temperature is measured and a temperature thus measured is compared with a particular low threshold.

- in order to detect a triggering condition, a failure to start is detected at the end of a given time during which the main electrical machine is operating in motor mode.

- when a condition for activating the supplementary starter is detected, the supplementary starter is actuated in such a way that its pinion meshes on a complementary ring in order to drive the internal-combustion engine, the main electrical machine is put into motor mode, when the pinion of the starter has been meshed, and the starter is cut off and the main electrical machine is placed into generator mode when it is detected that the internal-combustion engine has started.

- the operation of the main electrical machine in motor mode is cut off when a condition for activation of the supplementary starter is detected.

Other characteristics and advantages of the invention will emerge further from the description which follows, which is purely illustrative and non-limiting, and which should be read with regard to the attached drawings, in which:

- Figure 1 is a diagram illustrating a system according to one possible embodiment of the invention;

- Figures 2a and 2b are timing graphs on which have been plotted examples of possible power-supply sequences for the alternator/starter and the supplementary starter of the system of Figure 1. The starting and charging system shown in Figure 1 consists of:

- a separate alternator/starter 1, the shaft of which terminates in a pulley 2 which is linked to a pulley 3 of the crankshaft by way of a multi-groove belt 4; this alternator/starter is mounted in the space which the alternator usually takes up;

- a supplementary starter 5, the pinion of which can mesh with the toothing of a crown ring 6 in order to drive the shaft of the internal-combustion engine;

- drive electronics 7.

The drive electronics 7 consist of:

- a transistor bridge 8 which constitutes a reversible power converter, and which provides drive in starter mode and synchronous rectification in alternator mode.

- a management module 9 which drives the various transistors of the converter 8 and manages the following different functions:

- power in starter and alternator modes
- regulation in alternator mode
- transition from the starter mode to the alternator mode
- operating strategy for extreme conditions
- synchronisation of the two machines.

To that end, the said management module 9 is supplied with the voltage from the battery, referenced by B, to which it has been linked by way of a contact breaker 10 of the vehicle.

5 It receives information as input, allowing it to determine the angular position of the rotor of the alternator/starter 1, for example information supplied by sensors 11, such as Hall-effect sensors 11.

10 As output, it supplies the inductor of the alternator/starter 1 as well as the starter 5, and generates the voltages injected onto the gates (A, B, C; A', B', C') of the transistors of the bridge 8.

15 Figures 2a and 2b illustrate three sequences of power supply for the alternator/starter 1 and for the starter 5, corresponding to three different operating cases. These three power-supply sequences have been referenced by I, II and III.

20 The sequence I corresponds to the power supply which is applied when it is detected that the internal-combustion engine and the starting system are in extreme operating conditions.

25 The detection of the extreme conditions is done by means, for example, of one or more temperature sensors (not represented in Figure 1) which are linked to the management module 9, the latter performing a comparison of the measured temperature or temperatures with one or more given thresholds. The threshold or thresholds are, for example, functions of the characteristics of the internal-combustion engine.

30 When these extreme operating conditions are detected, the management module 9 then drives the alternator/starter 1 and the starter 5 according to the following sequence.

35 In a first phase (phase [1] in Figure 2), the starter 5 is supplied with power. Its drive pinion

moves and meshes on the toothed ring 6 of the transmission of the internal-combustion engine.

In a second phase, once engagement is assured, the alternator/starter is driven in motor mode (phase
5 [2]).

When the starting of the internal-combustion engine has been detected, the drive pinion of the starter 5 is made to disengage, while the alternator/starter 1 is switched over into generator mode (phase [3]).

10 Outside extreme operating conditions, it may happen that the starting invoked by the alternator/starter 1 does not happen sufficiently quickly.

In order to remedy this failure, the management module 9 controls the power supply to the alternator/starter and the starter 5 in the following way (sequence II).
15

When the closure of the switch 10 calls for starting, the module 9 supplies power to the inductor of the alternator/starter 1 so that it operates in motor mode, while the starter 5 is not called on (phase
20 [1]).

If the internal-combustion engine has still not started at the end of a time T, the power supply to the alternator/starter 1 is shut off, then the supplementary starter 5 is started up, so that its meshing pinion advances, then meshes with the toothed ring 6 (power-supply phase [2]).
25

After meshing occurs, the alternator/starter 1 is again powered in motor mode (power-supply phase
30 [3]).

When the starting of the internal-combustion engine has been detected, the drive pinion of the starter 5 is disengaged, while the alternator/starter 1 is driven as a generator (phase [4]).

35 Under normal operating conditions, that is to say if no particular set-point value has been detected

(low temperature, start-up duration exceeded, etc.), the power supply to the alternator/starter 1 and to the starter 5 is managed according to sequence III.

5 The alternator/starter 1 is initially driven in motor mode (phase [1]); when the starting of the internal-combustion engine has been detected, generator mode (phase [2]) is entered. For its part, the starter 5 is not activated.

CLAIMS

1. System, especially for a motor vehicle, able, on the one hand, to start up an internal-combustion engine
5 and, on the other hand, to charge an electrical circuit, including a main electrical machine able to operate, on the one hand, as a generator and, on the other hand, as an electric motor, the said electrical machine driving the internal-combustion engine by means of a
10 belt when it is operating in motor mode, the system further including management means which drive the main electrical machine, characterised in that it includes a supplementary starter, as well as means for detecting at least one condition for triggering the activation of
15 the said supplementary starter, and the management means drive the main electrical machine and the starter, according to a particular sequence, when the said condition is detected by the said detection means.

2. System according to Claim 1, characterised in
20 that the said detection means include at least one temperature sensor, as well as means for comparing a temperature measured by the said sensor with a particular low threshold.

3. System according to one of Claims 1 and 2, characterised in that the detection means include means for
25 detecting a failure to start at the end of a given time during which the main electrical machine is operating in motor mode.

4. System according to one of the preceding claims,
30 characterised in that the management means include means for actuating the supplementary starter, when a condition for activating the supplementary starter is detected, in such a way that its pinion meshes on a complementary ring in order to drive the internal-
35 combustion engine, in order to drive the main electrical machine in motor mode, when the pinion of the

starter has been meshed and in order to cut off the starter and drive the main electrical machine in generator mode when it is detected that the internal-combustion engine has started.

5 5. System according to Claim 4, characterised in that the management means include means for cutting off the operation of the main electrical machine in motor mode, when a condition for activation of the supplementary starter is detected.

10 6. Method for control of a system, especially for a motor vehicle, able, on the one hand, to start up an internal-combustion engine and, on the other hand, to charge an electrical circuit, including a main electrical machine able to operate, on the one hand, as a generator and, on the other hand, as an electric motor, the said electrical machine driving the internal-combustion engine by means of a belt when it is operating in motor mode, characterised in that, with the said system including a supplementary starter, at least one
15 condition for triggering the activation of the said supplementary starter is detected, and the main electrical machine and the starter are driven according to a particular sequence when the said condition is detected.

25 7. Method according to Claim 6, characterised in that, in order to detect a triggering condition, at least one temperature is measured and a temperature thus measured is compared with a particular low threshold.

30 8. Method according to one of Claims 6 and 7, characterised in that, in order to detect a triggering condition, a failure to start is detected at the end of a given time during which the main electrical machine is operating in motor mode.

35 9. Method according to one of Claims 6 to 8, characterised in that, when a condition for activating the

supplementary starter is detected, the supplementary starter is actuated in such a way that its pinion meshes on a complementary ring in order to drive the internal-combustion engine, the main electrical machine
5 is put into motor mode, when the pinion of the starter has been meshed, and the starter is cut off and the main electrical machine is placed into generator mode when it is detected that the internal-combustion engine has started.

- 10 10. Method according to Claim 9, characterised in that the operation of the main electrical machine in motor mode is cut off when a condition for activation of the supplementary starter is detected.

PATENT OF INVENTION

SYSTEM, ESPECIALLY FOR A MOTOR VEHICLE, ABLE TO START AN INTERNAL-COMBUSTION ENGINE AND CHARGE AN ELECTRICAL CIRCUIT

Applicant: VALEO EQUIPEMENTS ELECTRIQUES MOTEUR

ABSTRACT

System, especially for a motor vehicle, able, on the one hand, to start up an internal-combustion engine and, on the other hand, to charge an electrical circuit, including a main electrical machine able to operate, on the one hand, as a generator and, on the other hand, as an electric motor, the said electrical machine driving the internal-combustion engine by means of a belt when it is operating in motor mode, the system further including management means which drive the main electrical machine, characterised in that it includes a supplementary starter, as well as means for detecting at least one condition for triggering the activation of the said supplementary starter, and the management means drive the main electrical machine and the starter, according to a particular sequence, when the said condition is detected by the said detection means.

FIGURE 1

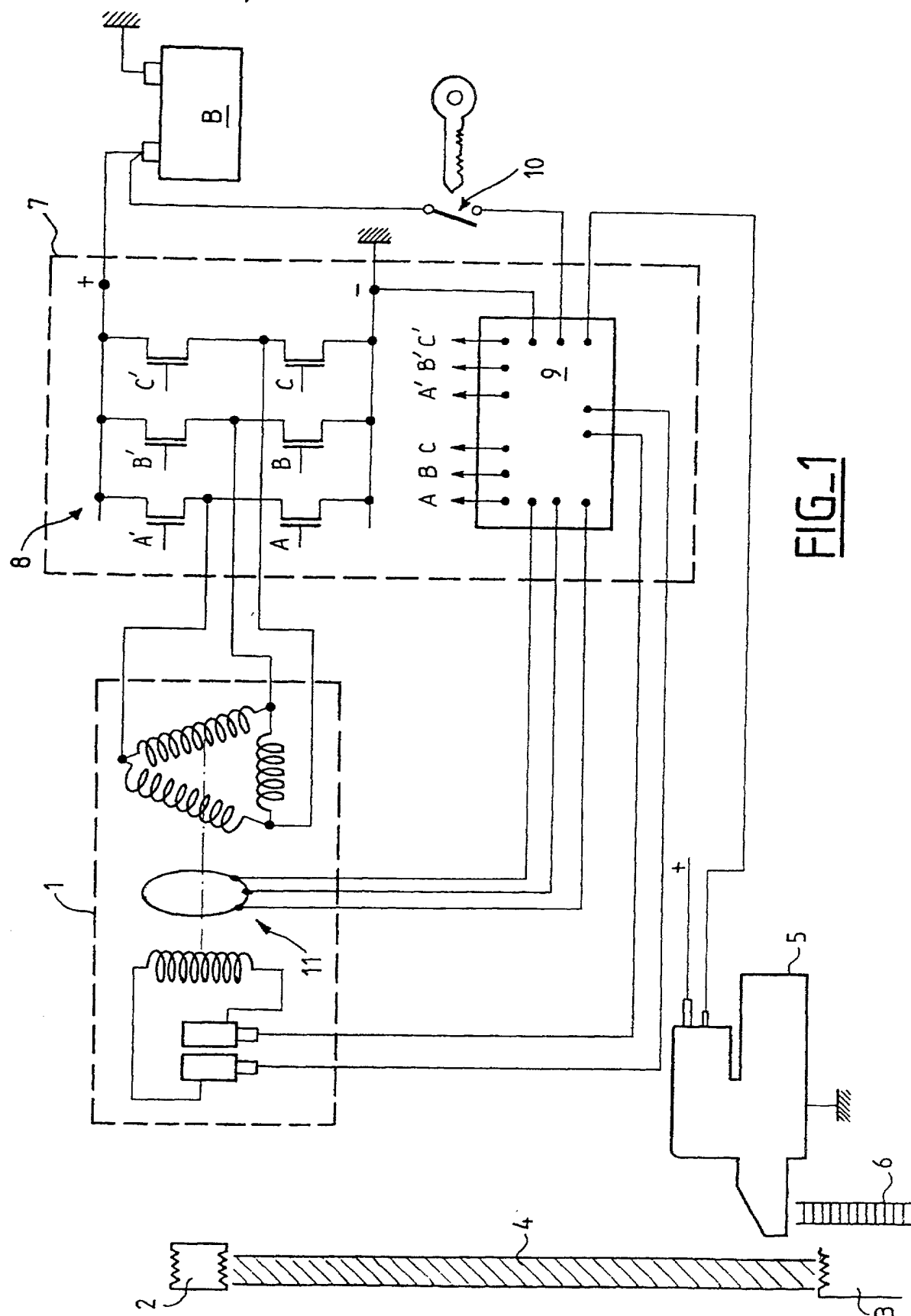
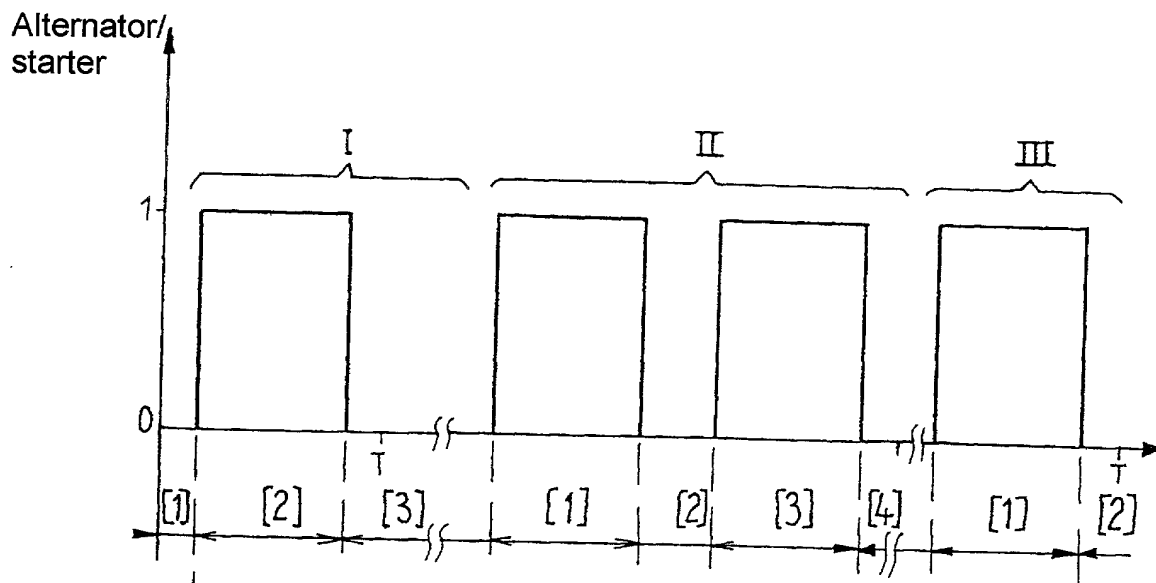
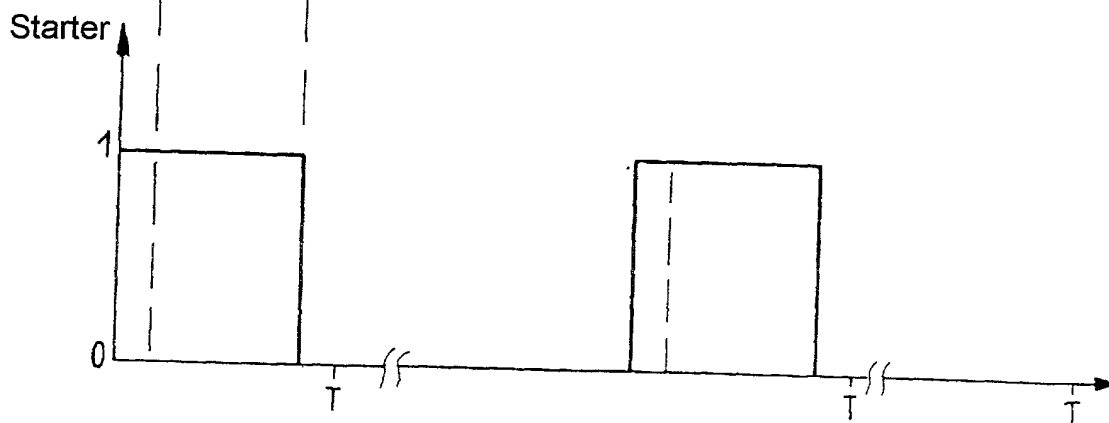


FIG. 1



FIG_2a



FIG_2b

RULE 63 (37 C.F.R. 1.63)
DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

SYSTEM, ESPECIALLY FOR A MOTOR VEHICLE, ABLE TO START AN INTERNAL-
the specification of which (CHECK applicable BOX(ES)) **COMBUSTION ENGINE AND CHARGE AN ELECTRICAL CIRCUIT**
☐ is attached hereto.

was filed on _____ as U.S. Application Serial Number _____
☒ was filed as PCT international Application Number **PCT/FR00/02245** on **04 August 2000**
and (if applicable to U.S. or PCT Application) was amended on _____

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above, to the best of my ability. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with 37 C.F.R. 1.56 as set forth on the reverse side hereof. I hereby claim foreign priority benefits under 35 U.S.C. 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date (1) before that of the application on which priority is claimed or (2) if no priority claimed, before the filing date of this application :

PRIOR FOREIGN APPLICATION(S)

| <u>Number</u> | <u>Country</u> | <u>Day/Month/Year Filed</u> | <u>Priority Claimed</u> <u>Yes - No</u> |
|-----------------|----------------|-----------------------------|--|
| 99.10316 | FRANCE | 09.08.1999 | XX |

I hereby claim the benefit under 35 U.S.C. 120/365 of all United States and PCT international applications listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in such prior applications in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose material information as defined in 37 C.F.R. 1.56 which occurred between the filing date of the prior applications and the national or PCT international filing date of this application :

PRIOR U.S. OR PCT APPLICATION(S)

| <u>Application Serial No.</u> | <u>Day/Month/Year filed</u> | <u>Status : Patented,</u> <u>Pending, Abandoned</u> |
|-------------------------------|-----------------------------|--|
| PCT/FR00/02245 | 04.08.2000 | |

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true ; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

And I hereby appoint

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(to whom all communications are to be directed)

to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith and with the resulting patent.

| | |
|--|--|
| 1) Inventor's Signature Daniel Richard | Date 02/12/2001 |
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